Site Need Statement

General Reference Information	
1 *	***Need Title*:** Toxic Gas Control During Waste Retrieval
2 *	***Need Code:*** RL-WT116
3 *	***Need Summary*:** There is the potential for toxic gases to be a problem during retrieval of waste from single-shell tanks. The current baseline does not require ventilation during all retrievals. The toxic gases are primarily ammonia with small amounts of volatile organics. The sluicing in C-106 was delayed due to the toxic gas issue and delays because of gas issues should not be permitted.
4 *	***Origination Date*:** November 2001
5 *	***Need Type*:** Technology Need
6	***Operation Office*:** Office of River Protection (ORP)
7	***Geographic Site Name*:** Hanford Site
8 *	***Project*:** Retrieval ***PBS No.:*** RL-TW04
9 *	***National Priority:*** ____1. High - Critical to the success of the EM program, and a solution is required to achieve the current planned cost and schedule. _X_2. Medium - Provides substantial benefit to EM program projects (e.g., moderate to high life-cycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays). ____3. Low - Provides opportunities for significant, but lower cost savings or risk reduction, may reduce the uncertainty in EM program project success.
10	***Operations Office Priority*:**
Problem Description Information	
11	***Operations Office Program Description*:** The overall purpose of the Retrieve and Transfer SST Waste function is to move the waste from the SSTs into preferred storage in the DST system. A primary objective of this function is to develop and test alternative and improved retrieval technologies to past-practice sluicing. As part of this effort Leak Detection Monitoring and Mitigation (LDMM) approaches are being developed for concurrent deployment. To support this effort Cold Test Training & Mock-up Facilities are being established. The baseline end state of the Retrieve and Transfer SST Waste function is: • Retrieval of all wastes from the SSTs • The safe, environmentally compliant transfer of this waste to the DSTs • SSTs in a ready state for implementing closure and final disposal of the SST farms.
12	***Need/Problem Description*:** Single-shell tanks contain gases that have the potential of being hazardous or at least a nuisance. These gases include ammonia and certain volatile organic species. Headspace sampling of single-shell tanks demonstrated that they are present. The ammonia may not be a problem, as any retrieval method will add water. Ammonia is soluble in water and so may not present a problem. However, sluicing may disturb zones where volatile organic gases are currently residing. How toxic gases are released, how fast and how to control them are not well understood. These need to be better understood by the time retrieval starts. ** **Program Baseline Summary (PBS) No.:** TW04 ** **Work Breakdown Structure (WBS) No.:** 5.02.01.01.01.01 ** **TIP No.:** The need for this is prior to sluicing single-shell tanks. This is 2007.
13	***Functional Performance Requirements*:**
**	***Schedule Requirements:*** The information from this study should be available prior to final design of the sluicing systems for retrieval of single-shell tanks.
14	***Definition of Solution*:**

15 *	***Targeted Focus Area*:** Tanks Focus Area (TFA)
16	***Potential Benefits*:**
17 *	***Potential Cost Savings*:** This is mostly a cost/schedule avoidance issue. (See #18 below.)
18 *	***Potential Cost Savings Narrative*:** Cost savings are not easily estimated. The biggest cost benefit would be in not losing time and schedule should a toxic gas release occur unexpectedly. Understanding of this problem may allow for engineering or operational actions that will preclude a problematic release. Increased worker safety has the potential of being the biggest impact of this activity.
**	***Technical Basis:*** The one recent sluicing campaign of C-106 had substantial delays because of potential problems with toxic gases. While a work around was found, some weeks were lost. In the future, the schedule may be tighter and such delays may be very costly. Understanding the need for toxic gas control may allow design or operation changes prior to start up to prevent these delays.
19	***Cultural/Stakeholder Basis*:** Long-term disposal of the high-level wastes stored in Hanford's underground tanks is a national priority. The DOE has a legal agreement (the Tri-Party Agreement) with the Environmental Protection Agency and the State of Washington Department of Ecology to dispose of the waste according to a stated schedule. Native American tribal interests and a number of public interest groups monitor adherence to this agreement. Program delays due to inability to retrieve and deliver waste feeds containing solids may violate the Tri-Party Agreement.
20	***Environment, Safety, and Health Basis*:** Worker safety and health could be affected by better understanding of the potential for toxic gas releases.
21	***Regulatory Drivers*:**
22 *	***Milestones*:**
23 *	***Material Streams*:** Hanford high-level defense waste. TW03 - Sludge, salt, liquid (RL-HLW-20)
24	***TSD System*:** Single Shell Tank systems
25	***Major Contaminants*:** Pu-238, 239, 240, 241; AM-241; U-238; C-14; Ni-59/63; Nb-94; Tc-99; I-129; Cm-242; Sr-90; Cs-137; Sn-126; Se-79; chromium; nitrate; nitrite; complexants (EDTA/HEDTA)
26	***Contaminated Media*:** Tank waste consisting of high morality sodium hydroxide/sodium nitrate solution containing saturated saltcake and/or sludge.
27	***Volume/Size of Contaminated Media*:** The single shell tanks are generally 75 ft. in diameter, and up to 40 feet deep with their tops buried about 10 feet below the ground surface.
28 *	***Earliest Date Required*:** FY 2007
29 *	***Latest Date Required*:** FY 2020
Baseline Technology Information	
30	***Baseline Technology (ies)/Process*:** **Technology Insertion Point**: The need for this is prior to sluicing single-shell tanks. This is 2007.
31	***Life-Cycle Cost Using Baseline*:**
32	***Uncertainty on Baseline Life-Cycle Cost*:**
33	***Completion Date Using Baseline:***
Points of Contact (POC)	
34	***Contractor End User POCs*:** D.A. (Dan) Reynolds, CHG, 509-373-3115, F/509-373-4641 Daniel_A_Reynolds@rl.gov
35	***DOE End User POCs*:** E.J. (Joe) Cruz, DOE-PRD, 509-372-2606, F/509-373-1313, E_J_Cruz@rl.gov
36**	***Other Contacts:*** A. F. (Anne-Marie) Choho, CHG, 509-372-8280, F/509-373-6382, Anne-Marie_F_Choho@rl.gov K.A. (Ken) Gasper, CHG, 509-371-3607, F/509-371-3504, Kenneth_A_Ken_Gasper@rl.gov

*Element of a Site Need Statement appearing in IPABS-IS
**Element of a Site Need Statement required by CHG